Public Schools of North Carolina
State Board of Education | Department of Public Instruction

This document is designed to help North Carolina educators teach the Common Core. NCDPI staff are continually updating and improving these tools to better serve teachers.

Algebra I Curriculum Crosswalk

The following document is to be used to compare the 2003 North Carolina Mathematics Standard Course of Study for Algebra I and the Common Core State Standards for Mathematics Algebra I course.

As noted in the Common Core State Standards for Mathematics document, the high school standards specify the mathematics that all students should study in order to be college and career ready. Mathematics concepts that lay the foundation for more advanced courses are indicated by a plus (+). Specific modeling standards appear throughout the high school Common Core State Standards for Mathematics and are indicated by a star (). The high school standards were developed in conceptual categories that portray a coherent view of high school mathematics that cross a number of course boundaries. These conceptual categories include:

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

To download the Common Core State Standards, please visit http://www.corestandards.org/the-standards.

Important Note: The current SCoS will continue to be the taught and tested standards in the 2010-11 and 2011-12 school years. We expect the new Common Core standards to be taught and assessed in schools for the first time in the 2012-13 school year. That said, we are providing resources now and over the next two-years so that schools and teachers can get a head start on internalizing and planning to teach the new standards.

NC SCOS			Common Core			
Strand	Objective	Text of objective	Domain	Standard	**Cluster** Text of objective	Comments
Numbers & Operations	1.01	Write equivalent forms of algebraic expressions to solve problems.				
		a) Apply the laws of exponents				Applying the laws of exponents using numerical bases and integer exponents is in 8th grade CCSS. However, N.RN1, N.RN.2, and N.RN.3 address these laws using rational exponents.
		b) Operate with polynomials	Arithmetic with Polynomials and Rational Expressions	A.APR.1	**Perform arithmetic operations on polynomials** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	Division of polynomials is not addressed in the CCSS. Linear and quadratic expressions are the expectations at this level.
		c) Factor polynomials	Seeing Structure in Expressions	A.SSE.2	**Interpret the structure of expressions** Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*	Linear, exponential and quadratic expressions are the expectations at this level.
	1.02	Use formulas and algebraic expressions, including iterative and	Creating Equations	A.CED.4	**Create equations that describe numbers or relationships**	Linear, quadratic and exponential (integer input only) equations are

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		recursive forms, to model and solve problems.			Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*	the expectations at this level.
			Building Functions	F.BF.2	**Build a function that models a relationship between two quantities** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
			Interpreting Functions	F.IF.3	**Understand the concept of a function and use function notation** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.*	
	1.03	Model and solve problems using direct variation.				Moved to 7th grade CCSS.
			The Real Number System	N.RN.1	**Extend the properties of exponents to rational exponents.** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(^{1/3})^3$ to hold, so $(5^{1/3})^3$ must equal 5.*	Moved from 2003 Algebra II NC SCOS.

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				N.RN.2	**Extend the properties of exponents to rational exponents.** Rewrite expressions involving radicals and rational exponents using the properties of exponents.	Moved from 2003 Algebra II NC SCOS.
				N.RN.3	**Use properties of rational and irrational numbers.** Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	New to CCSS.
			Seeing Structure in Expressions	A.SSE.1	**Interpret the structure of expressions** Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients.	Interpreting expressions and parts of expressions is new to the CCSS. Linear, exponential and quadratic expressions are the expectations at this level.
				A.SSE.1	**Interpret the structure of expressions** Interpret expressions that represent a quantity in terms of its context. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret P(1+r)n as the product of P and a factor not depending on P.*	Interpreting expressions and parts of expressions is new to the CCSS. Linear, exponential and quadratic expressions are the expectations at this level.
				A.SSE.3	**Write expressions in equivalent forms to solve problems** Choose and produce an equivalent form of an expression	Not explicit in the 2003 NC SCOS. Manipulation of expressions is foundational for

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					to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines.	working with functions.
					Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Not explicit in the 2003 NC SCOS. Manipulation of expressions is foundational for working with functions.
					Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15t can be rewritten as* $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*	Not explicit in the 2003 NC SCOS. Manipulation of expressions is foundational for working with functions.
Geometry &	2.01	Find the lengths and midpoints of segments to solve problems.				Finding the lengths of segments is in 8th grade CCSS. Midpoint has moved to Geometry CCSS.

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	2.02	Use the parallelism or perpendicularity of lines and segments to solve problems.				Moved to Geometry CCSS.
			Quantities	N.Q.1	**Reason quantitatively and use units to solve problems.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	New to CCSS.
				N.Q.2	**Reason quantitatively and use units to solve problems.** Define appropriate quantities for the purpose of descriptive modeling.	New to CCSS.
				N.Q.3	**Reason quantitatively and use units to solve problems.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	New to CCSS.
Data Analysis and Probability	3.01	Use matrices to display and interpret data.				Moved to a fourth course to follow Algebra II.
	3.02	Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.				Moved to a fourth course to follow Algebra II.
	3.03	Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-	Interpreting Categorical and Quantitative Data	S.ID.6	**Summarize, represent, and interpret data on two categorical and quantitative variables** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.	

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		of-fit and use the model, where appropriate, to draw conclusions or make predictions.			Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.	
					Summarize, represent, and interpret data on two categorical and quantitative variables	
					Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. b. Informally assess the fit of a function by plotting and analyzing residuals.	
					Summarize, represent, and interpret data on two categorical and quantitative variables	
					Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. c. Fit a linear function for a scatter plot that suggests a linear association.	
				S.ID.7	**Interpret linear models**	
					Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	
			Interpreting Categorical and Quantitative Data	S. ID.1	**Summarize, represent, and interpret data on a single count or measurement variable**	Continuation of foundational objectives from both Middle School CCSS and 2003 NC SCOS.
					Represent data with plots on the real number line (dot plots, histograms, and box plots).	
				S.ID.2	**Summarize, represent, and interpret data on a single count or measurement variable**	Continuation of foundational objectives from Middle School CCSS. Emphasis on standard
					Use statistics appropriate to the shape of the data	

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					distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	deviation is the expectation at this level.
				S.ID.3	**Summarize, represent, and interpret data on a single count or measurement variable** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	New to CCSS.
				S.ID.5	**Summarize, represent, and interpret data on two categorical and quantitative variables** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	Continuation of foundational objectives from Middle School CCSS. Emphasis on interpretation is the expectation at this level.
				S.ID.8	**Interpret linear models** Compute (using technology) and interpret the correlation coefficient of a linear fit.	New to CCSS.
				S.ID 9	**Interpret linear models** Distinguish between correlation and causation.	New to CCSS.
.Algebra	4.01	Use linear functions or inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret constants and coefficients in the context of the	Creating Equations	A.CED.1	**Create equations that describe numbers or relationships** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	Quadratic functions are in the Algebra I NC SCOS, 4.02. Exponential functions are in the Algebra I NC SCOS, 4.04. Rational functions are in the Algebra II NC SCOS. Justifying results is not included

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		problem.				in the CCSS. Linear, quadratic and exponential (integer input only) equations are the expectations at this level.
				A.CED.2	**Create equations that describe numbers or relationships** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Linear, quadratic and exponential (integer input only) equations are the expectations at this level.
			Interpreting Functions	F.IF.2	**Understand the concept of a function and use function notation** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	
				F.IF.4	**Interpret functions that arise in applications in terms of the context** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*	Linear, exponential and quadratic functions are expected at this level.
				F.IF	**Interpret functions that arise in applications in terms of the context**	Linear, exponential and quadratic functions are the expectations at

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					Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	this level.
				F.IF.7	**Analyze functions using different representations** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	
			Building Functions	F.BF.1	**Build a function that models a relationship between two quantities** Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	
			Linear, Quadratic, and Exponential Models	F.LE.5	**Interpret expressions for functions in terms of the situation they model** Interpret the parameters in a linear or exponential function in terms of a context.	
	4.02	Graph, factor, and evaluate quadratic functions to solve problems.	Reasoning with Equations & Inequalities	A.REI.4	**Solve equations and inequalities in one variable** Solve quadratic equations in one variable.	

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					a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	
					Solve equations and inequalities in one variable	
					Solve quadratic equations in one variable. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	
			Interpreting Functions	F.IF.7	**Analyze functions using different representations**	
					Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	
				F.	**Analyze functions using different representations**	Linear, exponential, quadratic,

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					Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	absolute value, step, and piecewise-defined functions are the expectations at this level.
	4.03	Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.	Creating Equations	A.CED.3	**Create equations that describe numbers or relationships** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non- viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	Linear equations are the expectations at this level.
			Reasoning with Equations and Inequalities	A.REI.5	**Solve systems of equations** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	
				A.REI.6	**Solve systems of equations** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	

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				A.REI.7	**Represent and solve equations and inequalities graphically** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	
				A.REI.10	**Represent and solve equations and inequalities graphically** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	
				A.REI.11	**Represent and solve equations and inequalities graphically** Explain why the *x*-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	Linear and exponential equations and inequalities are the expectations at this level.
				A.REI.12	**Represent and solve equations and inequalities graphically** Graph the solutions to a linear inequality in two variables as a half- plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	

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	4.04	Graph and evaluate exponential functions to solve problems.	Interpreting Functions	F.IF.7	**Analyze functions using different representations** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	Graphing trigonometric and logarithmic functions is new from 2003 Algebra II NC SCOS. Linear, exponential, quadratic, absolute value, step, and piecewise-defined functions are the expectations at this level.
			Linear, Quadratic & Exponential Models	F.LE.1	**Construct and compare linear and exponential models and solve problems** Distinguish between situations that can be modeled with linear functions and with exponential functions a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	
					Construct and compare linear and exponential models and solve problems Distinguish between situations that can be modeled with linear functions and with exponential functions b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	
					Construct and compare linear and exponential models and solve problems Distinguish between situations that can be modeled with linear functions and with exponential functions c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	

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				FLE.2	**Construct and compare linear and exponential models and solve problems** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	
			Reasoning with Equations and Inequalities	A.REI.1	**Understand solving equations as a process of reasoning and explain the reasoning** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	New to CCSS.
				A.REI.3	**Solve equations and inequalities in one variable** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Moved from 2003 Middle School NC SCOS.
			Interpreting Functions	F.IF.1	**Understand the concept of a function and use function notation** Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.	Moved from 2003 Middle School NC SCOS.

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				F.IF.6	**Interpret functions that arise in applications in terms of the context** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	New to CCSS. Linear, exponential and quadratic functions are the expectations at this level.
				F.IF.7	**Analyze functions using different representations** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	Moved from Algebra II NC SCOS. Linear, exponential, quadratic, absolute value, step, and piecewise-defined functions are the expectations at this level.
				F.IF.8	**Analyze functions using different representations** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, *and classify them as representing exponential growth or decay.*	Moved from 2003 Algebra II NC SCOS. Linear, exponential, quadratic, absolute value, step, and piecewise-defined functions are the expectations at this level.

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				F.IF.9	**Analyze functions using different representations** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*	New to CCSS. Linear, exponential, quadratic, absolute value, step, and piecewise-defined functions are the expectations at this level.
			Building Functions	F.BF.1	**Build a function that models a relationship between two quantities** Write a function that describes a relationship between two quantities. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*	Moved from 2003 Algebra II NC SCOS. Linear, exponential, and quadratic functions are the expectations at the level.
				F.BF.3	**Build new functions from existing functions** Identify the effect on the graph of replacing *f(x)* by *f(x) + k, k f(x), f(kx),* and *f(x + k)* for specific values of k (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	Moved from 2003 Algebra II NC SCOS. Linear, exponential, quadratic and absolute value functions are the expectations for this level.
				F.B F.4	**Build new functions from existing functions** Find inverse functions.	Moved from 2003 Algebra II NC SCOS.

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					a. Solve an equation of the form *f(x) = c* for a simple function *f* that has an inverse and write an expression for the inverse. *For example, f(x) =2 x^3 or f(x) = (x+1)/(x–1) for x 1.*	Linear functions are the expectation at the level.
			Linear, Quadratic & Exponential Models	F.LE.3	**Construct and compare linear, quadratic, and exponential models and solve problems** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	New to CCSS.